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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
SUCHECKI, KRYSTYNA

ART UNIT	PAPER NUMBER
2882	

DATE MAILED: 09/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/977,065	Applicant(s) BHARDWAJ ET AL.	
	Examiner Krystyna Suchecki	Art Unit 2882	

-- The MAILING DATE of this communication app ars on the cover sheet with th correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *41* is/are allowed.

6)☒ Claim(s) *1-4,6,13-17,19,26-30,32,39,40,42,44 and 45* is/are rejected.

7)☒ Claim(s) *5,7-12,15,18,20-25,31 and 33-38* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 October 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Objections

1. Claims 11 and 15 are objected to because of the following informalities: Claim 11 is grammatically incorrect in line 2. Claim 15 contains a spelling error in line 4. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-4, 14-17, 27-30, and 44-45 are rejected under 35 U.S.C. 102(e) as being anticipated by Klekamp (US 2002/0039474).

4. Regarding Claims 1, 14 and 27, Klekamp teaches a planar lightwave circuit, a method for forming a planar lightwave circuit and a method for protecting and balancing stress in a planar lightwave circuit, comprising at least one optical waveguide core; at least one feature proximate the core having at least one stress- engineered property to balance stress and therefore minimize birefringence affecting the core; and a protective passivation layer formed over the core and the feature, the passivation layer formed to be substantially non-interfering with the balanced stress affecting the core provided by the feature (Paragraphs 0007-0009).

5. Regarding Claims 2, 15 and 28, Klekamp teaches the planar lightwave circuit wherein the at least one feature comprises an overcladding layer formed over the core, and doped to balance stress affecting the core (Paragraphs 0007-0009).

6. Regarding Claims 3, 16 and 29, Klekamp teaches the planar lightwave circuit further comprising: a substrate; and an undercladding formed over the substrate and under the core; wherein the overcladding is doped to have a coefficient of thermal expansion approximately matched to that of the substrate to thereby symmetrically distribute stress in the undercladding between the overcladding and the substrate, and therefore away from the core (Paragraphs 0007-0009).

7. Regarding Claims 4, 17 and 30, Klekamp inherently teaches the planar lightwave circuit wherein the protective passivation layer is formed to have a coefficient of thermal expansion approximately matched to that of the overcladding such that it is substantially non-interfering with the balanced stress affecting the core provided by the overcladding. Passivation materials are known in the art to be selected to provide chemical resistance while otherwise not interfereing with the functionality of a device. Because the Klekamp reference teaches the use of the same passivation layer, it is inherent that the passivation layer will have the same properties such as suitability to perform chemical resistance functions while not interfering with other aspects such as the coefficient of thermal expansion (See *In re Fitzgerald*, 619 F.2d 67, 70, 205 USPQ 594, 596 (CCPA 1980)).

8. Regarding Claims 44-45, Figure 5 of Klekamp teaches a method for forming a planar lightwave circuit, comprising providing a substrate (3) and a waveguide undercladding (2)

formed thereover; forming a waveguide core material (1) layer over the undercladding; etching portions of the waveguide core material away to form at least two waveguide cores, said etching proceeding into the undercladding between the two cores (particulars of "d"), to a point lower than the lower surfaces of the cores; filling the etched portions with a waveguide overcladding (4); wherein the lower point of the undercladding between the cores relieves stress and resulting birefringence from the cores and further wherein the distance between the point and the lower surfaces of the cores is proportional to the amount of stress relieved from the cores (Paragraphs 0029-0030).

9. Claims 40 and 42-43 are rejected under 35 U.S.C. 102(b) as being anticipated by Wildermuth (E. Letters).

10. Regarding Cliam 40, Wildermuth teaches a planar lightwave circuit having a depth-controlled stress release groove, comprising: at least two waveguide cores formed between an undercladding layer and an overcladding layer, the undercladding layer between the two cores terminating at a point lower than the lower surfaces of the two cores; and a stress release groove formed through the overcladding between the two cores to a depth corresponding to the lower point (Figure 1).

11. Regarding Claim 42, Wildermuth teaches a planar lightwave circuit having at least two waveguide cores formed over an undercladding layer, the portion of the undercladding layer between the two cores terminating at a point lower than the lower surfaces of the cores to relieve stress and resulting birefringence from the cores; and an overcladding formed over the undercladding between the two cores (Figure 1).

12. Regarding Claim 43, Wildermuth teaches a planar lightwave circuit wherein the distance between the point and the lower surfaces of the cores is proportional to the amount of stress relieved from the cores (Page 1662, paticulars of etch depth determination).

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. Claims 6, 13, 19, 26, 32 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Klekamp.

15. Regarding Claims 6, 13, 19, 26, 32 and 39, Klekamp teaches planar lightwave circuit layers and features above in references to prior art.

16. Klekamp does not explicitly teach the above planar lightwave circuit and feature with the at least one feature comprising portions of the undercladding, respectively adjacent to each lower edge of the core, terminating at a point lower than the core, to further effect a removal of stress away from the core.

17. Klekamp instead separately teaches, as an improvement to the prior art, the at least one feature comprising portions of the undercladding, respectively adjacent to each lower edge of the core, terminating at a point lower than the core, to further effect a removal of stress away from the core (Figure 2, portion 5). A material is selected based upon its suitablitlity and ability to remove stress in the circuit and to remove a processing step that would involve applying an additional passivation layer (Paragraph 27).

18. Since Klekamp is aware of materials and layering means to achieve balanced stress, and Klekamp further teaches an additional means for stress removal, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the additional features regarding the adjacent lower edges of a planar lightwave core with the materials and layers taught by Klekamp in the prior art in order to further effect a removal of stress away from the core and to remove the processing step of applying an additional passivation layer. Klekamp's invention would benefit because, rather than applying another layer, Klekamp could simply processes an existing layer to form a passivation layer, while maintaining other stress removal features.

Allowable Subject Matter

19. Claim 41 is allowed.

20. Claims 5, 7-12, 18, 20-25, 31, and 33-38 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

21. The following is a statement of reasons for the indication of allowable subject matter: Claims 5, 18 and 31 contain allowable subject matter for at least the reason that prior art fails to teach or suggest a planar lightwave circuit with stress-compensation means wherein the overcladding is doped to have a coefficient of thermal expansion approximately matched to that of the substrate, wherein a passivation layer covering the overcladding comprises silicon nitride. While silicon nitride is a known passivation material in the art, such as Kawachi, the specific combination of this material with the other stress compensation materials as claimed is not suggested in the prior art. Claims 7, 11, 20, 24, 33 and 37 contain allowable subject matter for at

least the reason that prior art fails to teach or suggest a planar lightwave circuit with stress-compensation means as claimed to comprise both a passivation layer and stress release groove. While the prior art, such as Kawachi teaches the use of stress release grooves, it does not suggest the use of the circuit layers as claimed concurrently with the grooves. Claims 8-10, 12, 21-23, 25, 34-36 and 38 are allowable by virtue of their dependency. Claim 41 contains allowable subject matter for at least the reason that prior art fails to teach or suggest a method for forming a stress release groove in a planar lightwave circuit comprising the overcladding etching step as claimed. Prior art such as Klekamp teaches core formation, core etching and overcladding filling steps, but does not suggest later etching the overcladding.

Conclusion

22. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Article to Kilian, cited by Applicant, is of interest for teachings on material selection for forming an overcladding and passivation portion. Patent to Ogusu (US 5,917,625) is of interest for Figures 9A and 9B. Ogusu fails to explicitly teach cladding materials (11) for affecting birefringence. Patent to Zhong (US 6,553,170) is of interest for passivation layer teachings and also for core separation and encapsulation steps. Patent to Kawachi (US 4,871,424) is of interest for teaching groove formation steps and the use of Silicon Nitride as a protective layer. Application to Sasaki (US 2001/0007606) is of interest for teaching over-etching an undercladding to form certain core features and stress compensation. Sasaki fails to teach passivation means, however.Any inquiry concerning this communication or earlier communications from the examiner should be directed to Krystyna Suchecki whose telephone

number is (703) 305-5424. The examiner can normally be reached on M-F 8-6, with alternating Fridays off.

23. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on (703) 308-4858. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

24. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4900.

ks

EDWARD J. GLICK
SUPERVISORY PATENT EXAMINER